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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/002,447	10/26/2001	Timothy J. Dalton	FIS920010239US1	3611

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Sean F. Sullivan, Esq.
Cantor Colburn LLP
55 Griffin Road South
Bloomfield, CT 06002

EXAMINER

LEWIS, MONICA

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 07/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/002,447

Applicant(s)

DALTON ET AL.

Examiner

Monica Lewis

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-- Th MAILING DATE of this communication appears on the cover sheet with the correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 10-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the amendment filed May 2, 2003.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as obvious over Agarwala et al. (U.S. Patent No. 6,033,939) in view of *Electronic Packaging and Interconnection Handbook* by Charles A. Harper.

In regards to claim 1, Agarwala et al. ("Agarwala") discloses the following:

a) an organic material (5) encapsulated underneath said conductive layer (For Example: See Column 7 Lines 5-23); and

b) the fuse structure is blown open by application of a beam of laser energy thereto (For Example: See Column 1 Lines 23 and 24).

In regards to claim 1, Agarwala fails to disclose the following:

a) a conductive layer.

Although Agarwala does not specifically state that (10) is a conductive layer and a top view of Figure 4 is not shown, it is well known in the art to use conductive layers with solder balls and conductive lines as shown in Harper (For Example: See Page 10.36 Figure 10.35). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Agarwala to include the metal traces

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as disclosed in Harper because they aid in establishing electrical communication (For Example: See Page 10.36 Figure 10.35).

Additionally, since Agarwala and Harper are both from the same field of endeavor, the purpose disclosed by Harper would have been recognized in the pertinent art of Agarwala.

In regards to claim 3, Agarwala discloses the following:

a) organic material is selected from a group that includes a polyimide, a polyamide, a polyarylene ether, a polyaromatic hydrocarbon (PAH), and a conductive polyaniline (For Example: Column 7 Lines 5-23).

5. Claims 2, 4 and 6 are rejected under 35 U.S.C. 103(a) as obvious over Agarwala et al. (U.S. Patent No. 6,033,939) in view of *Electronic Packaging and Interconnection Handbook* by Charles A. Harper and Stamper (U.S. Patent No. 6,111,301).

In regards to claim 2, Agarwala fails to disclose the following:

a) a liner material in electrical contact with said wiring segments and said conductive layer, said liner material further encapsulating said organic material between said wiring layer and said conductive layer.

However, Stamper discloses the use of liners (For Example: See Column 2 Lines 45-65). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Agarwala to include the use of liners as disclosed in Stamper because it is resistant to corrosion and aids in separating the wiring (For Example: See Column 2 Lines 45-65).

Additionally, since Agarwala and Stamper are both from the same field of endeavor, the purpose disclosed by Stamper would have been recognized in the pertinent art of Agarwala.

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In regards to claim 4, Agarwala fails to disclose the following:

a) liner material is selected from a group that includes TaN, Ta, TiN, Ti, W, WN, TaSiN, TiSiN, or alloys therefrom.

However, Stamper discloses the use of liners (For Example: See Column 2 Lines 45-65).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Agarwala to include the use of liners as disclosed in Stamper because it is resistant to corrosion and aids in separating the wiring (For Example: See Column 2 Lines 45-65).

Additionally, since Agarwala and Stamper are both from the same field of endeavor, the purpose disclosed by Stamper would have been recognized in the pertinent art of Agarwala.

In regards to claim 6, Agarwala discloses the following:

a) a pair of vias (9) formed within an insulating layer (6) and extending down to said wiring segments (For Example: See Figure 4); and

b) a mesa region of said insulating layer formed between said pair of vias (For Example: See Figure 4).

In regards to claim 6, Agarwala fails to disclose the following:

a) liner material is formed upon sides of said mesa region and said wiring segments.

However, Stamper discloses the use of liners (For Example: See Column 2 Lines 45-65).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Agarwala to include the use of liners as disclosed in Stamper because it is resistant to corrosion and aids in separating the wiring (For Example: See Column 2 Lines 45-65).

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Additionally, since Agarwala and Stamper are both from the same field of endeavor, the purpose disclosed by Stamper would have been recognized in the pertinent art of Agarwala.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as obvious over Agarwala et al. (U.S. Patent No. 6,033,939) in view of *Electronic Packaging and Interconnection Handbook* by Charles A. Harper and Lee et al. (U.S. Patent No. 6,300,233).

In regards to claim 5, Agarwala fails to disclose the following:

a) conductive layer is selected from a group that includes TaN, Ta, TiN, Ti, W, WN, TaSiN, TiSiN, or alloys therefrom (For Example: See Column 3 Lines 43 and 44).

However, Lee discloses the use of TiN and W (For Example: See Column 3 Lines 43 and 44 and Column 4 Lines 33-40). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Agarwala to include the use TiN or W as disclosed in Lee because it provides dense physical properties (For Example: See Column 4 Lines 53-56).

Additionally, since Agarwala and Lee are both from the same field of endeavor, the purpose disclosed by Lee would have been recognized in the pertinent art of Agarwala.

7. Claims 7-9 and 18 are rejected under 35 U.S.C. 103(a) as obvious over Agarwala et al. (U.S. Patent No. 6,033,939) in view of *Electronic Packaging and Interconnection Handbook* by Charles A. Harper, Stamper (U.S. Patent No. 6,111,301) and DiStefano et al. (U.S. Patent No. 5,590,460).

In regards to claim 7, Agarwala fails to disclose the following:

a) pair of vias is filled with said organic material.

However, DiStefano et al. ("DiStefano") discloses the use of organic material in vias (For Example: See Column 13 Lines 4-13). It would have been obvious to one having ordinary skill

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in the art at the time the invention was made to modify the semiconductor device of Agarwala to include the use of organic material as disclosed in DiStefano because it remains solid at temperatures below the activation temperature (For Example: See Column 13 Lines 4-13).

Additionally, since Agarwala and DiStefano are both from the same field of endeavor, the purpose disclosed by DiStefano would have been recognized in the pertinent art of Agarwala.

In regards to claim 8, Agarwala discloses the following:

a) organic material further occupies an inner area of the fuse structure, said inner area between the top of said mesa region and said conductive layer (For Example: See Figure 4).

In regards to claim 9, Agarwala discloses the following:

a) organic material (For Example: See Column 7 Lines 5-23).

In regards to claim 9, Agarwala fails to disclose the following:

a) conductive layer covers said inner area, thereby completing said conductive path.

Although Agarwala does not specifically state that (10) is a conductive layer and a top view of Figure 4 is not shown, it is well known in the art to use conductive layers with solder balls and conductive lines as shown in Harper (For Example: See Figure 10.35). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Agarwala to include the metal traces as disclosed in Harper because they aid in establishing electrical communication (For Example: See Figure 10.35).

Additionally, since Agarwala and Harper are both from the same field of endeavor, the purpose disclosed by Harper would have been recognized in the pertinent art of Agarwala.

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In regards to claim 18, Agarwala discloses the following:

a) an electrically conductive organic material (5), said electrically conductive material completing a conductive path between wiring segments included in a wiring layer (For Example: Figure 4);

b) a pair of vias formed within an insulating layer, said pair of vias extending down to said wiring segments (For Example: See Figure 4); and

c) the fuse structure is blown open by application of a beam of laser energy to said electrically conductive material (For Example: See Column 1 Lines 23 and 24).

In regards to claim 18, Agarwala fails to disclose the following:

a) an organic material filling the vias.

However, DiStefano discloses the use of organic material in vias (For Example: See Column 13 Lines 4-13). It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the semiconductor device of Agarwala to include the use of organic material as disclosed in DiStefano because it remains solid at temperatures below the activation temperature (For Example: See Column 13 Lines 4-13).

Additionally, since Agarwala and DiStefano are both from the same field of endeavor, the purpose disclosed by DiStefano would have been recognized in the pertinent art of Agarwala.

Response to Arguments

8. Applicant's arguments filed May 2, 2003 have been fully considered but they are not persuasive. First, Applicant argues that the "Agarwala reference does not disclose an organic material encapsulated underneath a conductive layer." However, Agarwala et al. ("Agarwala") does disclose an organic material (5) encapsulated underneath a conductive layer (10) (For Example: See Figure 4). Additionally, it is not clear how Applicant came to the conclusion that "the BLM pads 10 are not part of the actual fuse structure in Agarwala." There is nothing

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disclosed "in column 6 line 64 through column 7, lines 4 of Agarwala" that states that it is not. It is part of the structure (For Example: See Figure 4). Next, Applicant argues that "even if the pads could be considered as part of the fuse structure, they do not encapsulate the organic fuse link." That language is not in the claims. The claims state "an organic material encapsulated underneath said conductive layer." Finally, Applicant argues that the Agarwala and Lee do not disclose "a fuse structure having an electrically conductive organic material that is filled within a pair of vias." Agarwala does disclose a pair of vias (For Example: See Figure 4) and DiStefano et al. ("DiStefano") discloses vias that are filled with organic material (For Example: See Column 13 Lines 4-13).

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica Lewis whose telephone number is 703-305-3743. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 703-308-4905. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722 for regular and after final communications. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

ML
July 2, 2003



AMIR ZARABIAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800